

**Spacesuit Water Membrane Evaporator Integration with the  
ISS Extravehicular Mobility  
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Abstract**

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## **Abstract**

NASA has developed a Solid Water Membrane Evaporation (SWME) to provide cooling for the next generation spacesuit. One approach to increasing the TRL of the system is to incorporate this hardware with the existing EMU. Several integration issues were addressed to support a potential demonstration of the SWME with the existing EMU. Systems analysis was performed to assess the capability of the SWME to maintain crewmember cooling and comfort as a replacement for sublimation. The materials of the SWME were reviewed to address compatibility with the EMU. Conceptual system placement and integration with the EMU via an EVA umbilical system to ensure crew mobility and Airlock egress were performed. A concept of operation for EVA use was identified that is compatible with the existing system.

This concept is extensible as a means to provide cooling for the existing EMU. The cooling system of one of the EMUs on orbit has degraded, with the root cause undetermined. Should there be a common cause resident on ISS, this integration could provide a means to recover cooling capability for EMUs on orbit.